E75-10366
CR 143224

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104600-34-L
20 March 1975
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Skylab Support
Progress Report, February, 1975

(E75-10366) [RECOGNITION MAP ANALYSIS AND CROP ACREAGE ESTIMATION USING SKYLAB EREP DATA] Progress Report, Feb. 1975 (Environmental Research Inst. of Michigan) 2 p HC $3.25 CSCL 05B G3/43

N75-29508

Unclas
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Subcontract #1 Prime NAS9-13332

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Progress Report, February, 1975

The following report serves to report progress for February 1975 on Subcontract #1 of contract NAS9-13332. The financial reports for this contract are being submitted under separate cover.

The objective of this subcontract is to support the Skylab EREP effort of Michigan State University by: 1) performing standard recognition processing and producing recognition maps and area counts, 2) assisting in the analysis and interpretation of the recognition maps and other extracted information, 3) further developing and adapting, for use on Skylab EREP data, methods for estimating proportions of unresolved objects, and 4) applying proportion estimation techniques to one frame of EREP data to determine to what extent the accuracy of crop acreage estimates is improved.

The SKYLAB S-192 data being studied under this contract is the same data set being studied here at ERIM under NASA contract NAS9-13280, Richárd F. Nalepka Principal Investigator. Inasmuch as the same data is being prepared for two different contracts, a monthly report similar in content to this one is also being issued for the other contract.

During February, preparation of SKYLAB S-192 data continued. We had previously reported on initial implementation of a technique to aid in the exact location of agricultural fields in the data.

During the reporting period we successfully digitized all the points on one of the blown up U-2 photographs. A transformation was calculated, using regression techniques, to map digitized points from photography coordinates to scan line coordinates for scan line straightened data. It is noteworthy that the best fit regression used a first order equation with no cross terms. In all we had identified about 400 fields in a 40 section (square mile) area. We then, tentatively, merged this information with the S-192 data tape. The results of the digitization and transformation were reviewed for errors by printing graymaps of the new ground information channel. Finally, this map was compared to graymaps of selected channels and the results reviewed again. Areas were identified where it was clear that a boundary in the ground information channel was not correct. Finally, a new tape was generated with a corrected ground information channel.

Work was begun on location of points, etc, in the second U-2 photography but only half this job was completed during the month.

Additionally, during the month, a meeting was held with Dr. Manderscheid from Michigan State University to plan and review our data processing

program and to insure that there was complete understanding regarding Michigan State's processing goals and desired outputs.

Here we report on work carried out on a set of conic format tapes of the Michigan Test Site which were acquired for use on contract NAS9-13280 here at ERIM. It is reported here since we may, for reasons explained later in the report, perform some of the data processing for this contract on the conic data.

In mid-February we received a set of four tapes in conic (not scan line straightened) format covering southern Michigan. Tape 3 of the set was identified as containing data acquired over the test area proper and this tape was converted to ERIM format. A quick check of the data on the tape using the ERIM statistics and histogram program showed a marked similarity (as well it should) to the scan line straightened data we had been using. Thus it appears that the conic data had been preprocessed the same manner as the scanline straightened data.

Our next task with the conic data was to produce graymaps, preferably undistorted, for use in locating fields, water areas, etc. We began by making a plot showing the relationship between pixels from a conic scan and their assignment to straightened line and point numbers under a nearest neighbor rule, using a simple $\{x = R \cos\phi,\ y = R \sin\phi\}$ model. With this as a guide we marked off small arcs of the conic scan (each about 45-55 points wide) where the arc was fairly linear.

The data were graymapped, in these small strips of 45 or so points, using the deslew capability in the MAP program, where the slew for each strip had been determined from the plot. (The deslew capability allows a scan line to be printed diagonally across and down the page, incrementing one line every n characters). In this manner a map of SDO 9 was generated which appeared to be undistorted and definitely useable for our processing needs.

During the coming month we intend to extend the digitized ground information to the conic data coordinates. We also intend to look further into the question of SDO-to-SDO misregistration in both types of data. It is anticipated that if serious misregistration exists we will be able to efficiently process the conic data where the algorithm to register the data is simple and easy to implement, instead of processing the straightened data where such corrections are not simple to make. Further, we plan to begin training procedures by extracting signatures from areas of known object class and also by utilizing clustering techniques.

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